ORIGINAL

Before the
Federal Communications Commission
Washington, DC 20554

In the Matter of	IB Docket No. 99-67
Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding and Arrangements	
Petition of the National Telecommunications and Information Administration to Amend Part 25 of the Commission's Rules to Establish Emissions Limits for Mobile and Portable Earth Stations Operating in the 1610-1660.5 MHz Band	RM No. 9165

COMMENTS OF AERONAUTICAL RADIO, INC.

Aeronautical Radio, Inc. (ARINC), by its attorneys, hereby submits its Comments on the Commission's Notice of Proposed Rulemaking (NPRM) released March 5, 1999 (FCC 99-37),[1] concerning, *inter alia*, the adoption out-of-band emissions limits for mobile earth terminals (METs) operating in the 1610-1660.5 MHz band.

ARINC supports the Commission's proposal to adopt rules essentially in accordance with the recommendations of the National Telecommunications and Information Administration

[1] 64 Fed. Reg. 16687 (April 6, 1999).

(NTIA) as to the out-of-band emissions limits for METs in use with low-earth orbiting (LEO) mobile satellite systems (MSS). In particular, ARINC supports the Commission's proposal to adopt NTIA's time-phased out-of-band emissions limits for METs transmitting in the band 1610 to 1660.5 MHz.

ARINC is the communications company of the air transport industry. For the last 70 years, it has been active in domestic and international spectrum matters that affect air navigation. ARINC and its industry committees[2] have been active in developing and implementing specifications and technology for the utilization of the Global Navigation and Surveillance System (GNSS), which is comprised of the Russian Global Navigation Satellite System (GLONASS) and the United States Global Positioning Satellite (GPS) system. ARINC has also participated in efforts of the RTCA to delinate the conditions necessary to ensure that the GNSS can safely and efficiently be used to guide aircraft from the initiation to termination of flight.

The possibility of serious interference to the GNSS from METs operating in the 1610-1660.5 MHz band is well-established. The MSS industry expects tens of millions of METs to be operating throughout the world. ARINC and the air transport industry have been actively seeking reasonable protection for this safety-of-life radionavigation satellite service from these METs beginning with the negotiated rulemaking in Docket No. 92-166. Indeed, ARINC has pending a petition for reconsideration of these rules to the extent that they do not now adequately

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[2] Four industry committees are sponsored by ARINC: the Aeronautical Frequency Committee (AFC), the Airlines Electronic Engineering Committee (AEEC), the Aviation Maintenance Conference (AMC), and the Flight Simulator Engineering and Maintenance Conference (FSEMC).

protect GNSS.[3] This petition would be resolved by the adoption of NTIA's proposals. NTIA's petition for rulemaking[4] that is a part of this proceeding is the result of a compromise that ARINC believes properly balances the competing interests.

The aeronautical radionavigation band from 1559 to 1610 MHz must be sufficiently protected from out-of-band emissions if the full benefits of GNSS are to be realized. As the Commission has noted, the plans for GNSS contemplate the use of the entire spectrum between 1559 and 1610 MHz.[5] If protection from interference is provided to the GNSS, this satellite navigation system will provide more efficient and safer movement of aircraft throughout the world, thereby serving the public interest. As ARINC has stated before, studies have shown that the minimum level of protection for wideband emissions is -70 dBW/MHz and -80 dBW/700 Hz for narrowband emissions throughout the band.[6]

NTIA's time-phased out-of-band emissions limits for METs transmitting in the band 1610 to 1660.5 MHz is acceptable to ARINC, as long as GLONASS is protected from out-of-band emissions by January 1, 2005. The Commission's proposal will require that by January 1, 2005 all METs transmitting on frequencies between 1610 and 1660.5 MHz must suppress

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3 *See* ARINC Petition for Reconsideration (CC Docket No. 92-166) filed April 11, 1996. The adoption of the rules now proposed by the Commission would resolve the concerns expressed by ARINC in this petition for reconsideration.

4 RM 9165.

5 NPRM, ¶ 66.

6 *See* ARINC Comments (GEN Docket No. 98-68) filed July 27, 1998, at 3; *see e.g.,* RTCA, Assessment of Radio Frequency Interference Relevant to the GNSS (DO-235, Jan. 27, 1997, App. F; Recommendation ITU-R M. 1343, Table 1A1 and 2A1 Note 4; European Testing and Standards (ETSI) Standard TBR-041.

wideband emissions to -70 dBW/MHz in the band 1559-1605 MHz and suppress discrete emissions of less than 700 Hz to -80 dBW in the same band.[7] Under this proposal, METs put in service before 2002 that do not meet the -70 dBW/MHz and -80 dBW/MHz limits on emissions between 1580.42 and 1605 MHz must retire from service as of January 1, 2005. ARINC believes this requirement is critical to fostering the development of GNSS. Although the interim limits proposed by the Commission may delay the development of GNSS, they are acceptable to aviation.

GLONASS is operational, but Russia agreed to move its operations of GLONASS to lower frequencies to accommodate the big LEOs. Because the move to lower frequencies will not be competed until 2005, use of GLONASS in the United States will be delayed until that time. Based on the compromise reached in 1994, GLONASS will still be operating at frequencies up to 1608.8 MHz until 2005. Accordingly, ARINC urges the Commission to strictly enforce the proposed interim limits and the transition plan.

In proposing to adopt NTIA's interim limits, the Commission invited comments on the perceived need for these interim limits and whether they should apply to METs transmitting on frequencies in the 1626.5 to 1660.5 MHz range, as well as to the Big LEO terminals.[8] ARINC believes that the interim limits proposed for AMSC, COMSAT, and all others operating in the band 1626.5-1660.5 MHz in NPRM ¶ 55 are reasonable and necessary. The transmit frequencies of these METs are more removed from the radionavigation band and thus the terminals should comply with the same limits that the Big LEO METs must meet. ARINC also agrees with the

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7 NPRM, ¶ 62.

8 NPRM, ¶ 70.

FCC that there is no basis in law or equity for aviation to compensate AMSC for costs of conformance with these criteria.[9]

The Commission also invited comments on when use of GLONASS for domestic navigation during precision approach will likely commence and on the possibility of waiving or postponing the compliance deadline with respect to emissions in the 1597 to 1605 MHz band in the event that domestic implementation of GLONASS proves slower than expected.[10] RTCA, Inc., through SC-159, has been working on precision approach MOPS (minimum operational performance standards) for domestic use and is studying the use of GNSS for control aircraft movement on the ground at airports.[11] The International Civil Aviation Organization (IACO) continues to work to incorporate GLONASS into the GNSS on an equal basis with GPS. The operation of GLONASS frequencies should be fully protected in U.S. airspace since it will be used by non-U.S. aircraft operating in U.S. airspace. Such aircraft are permitted to use U.S. airspace under Chapter 2 of the Convention of International Civil Aviation and may use GLONASS as their sole means of navigation.[12] GNSS consists of both GPS and GLONASS today. The United States should protect GLONASS so that other countries will honor our use of GPS. Aircraft should be free to use either GLONASS or GPS or both from air navigation in the United States, including precision approach and landing. Accordingly, ARINC urges the

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9 NPRM ¶ 74.

10 NPRM, ¶ 73.

11 RCTA, The Role of the Global Navigation Satellite System (GNSS) in Supporting Airport Surface Operations (DO-247, Jan. 7, 1999).

12 Convention on International Civil Aviation, Chapter 2 (Chicago, 1947).

Commission to adopt the proposed requirements for emissions in the 1559-1610 MHz band and recommends against the possibility of a waiver or postponement of the compliance deadline.

In the meantime, the European Community is proposing to establish what may became a third component of GNSS, a system known as Galileo. This system will also require protection, and the proposed out-of-band limit in LEOs will assure an appropriate level of confidence in this system. The availability of GLONASS (and Galileo) to aircraft in the United States can increase the safety-of- flight by providing an important integrity check and by increasing the availability of vital navigation information and the critical approach phase of the flight.

The limits proposed by NTIA and the Commission are predicated on a separation of 100 feet between aircraft antenna and the MES. This criteria seems reasonable both for approach and airport surface operations. Non-aviation applications might involve smaller separations, but this assumption continues to be valid for aviation use. The receivers tested by RTCA upon which the -70 dBW/MHz and -80 dBW/700Hz limits were developed were designed for air transport use. Lesser systems may be practical, but greater channel rejection is not. The protection criteria apply to in-band interference, not adjacent channel rejection.

The FCC asks what limits should apply between 1605 and 1610 MHz.[13] The aviation parties to RTCA SC-159 demonstrated that the wideband limits should be linearly interpretated from -70 dBW/MHz at 1605 MHz up to -14 dBW/MHz at 1610 MHz and the narrow band limit should be -80 dBW/700 Hz at 1605 MHz and rise linearly to -20 dBW/700 Hz at 1610 MHz.[14] No reasons have been advanced to depart from these limits.

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[13] NPRM ¶ 83.

[14] RTCA DO-235, App. F.

For the above reasons, ARINC urges the Commission to adopt its proposal regarding out-of-band emission limits for METs. It is clear that increased accuracy, integrity, availability and continuity in aeronautical navigation will be provided by avionics that use both GLONASS and the GPS, as contemplated by GNSS. The level of protection that the Commission seeks to establish for GNSS will facilitate the full development of this worldwide satellite navigation system, and protect the safety-of-life and property in the air. The compromise proposed by NTIA and the FCC reasonably accommodate capacity interests and would serve the public interest.

Respectfully submitted,

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